

What is claimed is:

1. A software agent failure tolerant computer architecture for managing resources
5 for transfer of data stored in a data storage environment including at least two data
storage systems, the architecture comprising:
a data transfer server;
a primary software agent in communication with at least one of the two data storage
systems and the data transfer server, the agent configured for performing data transfer
10 operations in response to commands from the data transfer server;
one or more failover software agents in communication with the primary software agent,
the data transfer server, and at least one of the two data storage systems;
a failover protocol wherein if the primary agent experiences a failure, at least one of the
one or more failover software agents takes over the data transfer operations in response to
15 one or more data transfer server commands to take over.
2. The architecture of Claim 1, wherein the data transfer operation is a replication of
data within the data storage environment.
- 20 3. The architecture of Claim 2, wherein server commands to the software agent are
sent over a network in accordance with an IP protocol.

4. The architecture of Claim 3, wherein the software agent communicates with the at least one data storage system over the network in accordance with a Fibre Channel protocol.

5 5. The architecture of Claim 1, wherein a predetermined hierarchal relationship is followed by the server to select the order in which each failover server is commanded to take over the work of the primary server.

6. A software agent failure tolerant computer architecture for managing resources
10 for replication of data stored in a data storage environment including at least two data storage systems, and wherein data is replicated from one of the at least two data storage systems to at least one other data storage system of the at least two data storage systems, the architecture comprising:

a data replication management server;

15 a primary software agent in communication with at least one of the two data storage systems and the data replication management server, the agent configured for performing data replication operations in response to commands from the data replication management server;

one or more failover software agents in communication with the primary software agent,

20 the data replication management server, and at least one of the two data storage systems;

a failover protocol wherein if the primary agent experiences a failure, at least one of the one or more failover software agents takes over the data replication operations in response to one or more data replication manager server commands to take over.

5 7. The architecture of Claim 6, wherein server commands to the software agent are sent over a network in accordance with an IP protocol.

8. The architecture of Claim 7, wherein the software agent communicates with the at least one data storage system over the network in accordance with a Fibre Channel
10 protocol.

9. The architecture of Claim 6, wherein the server uses a predetermined hierarchal relationship to select the order in which each failover server is commanded to take over the work of the primary server.

15

10. A method for managing fault-tolerant resources for replication of data stored in a data storage environment including at least two data storage systems, and wherein data is replicated from one of the at least two data storage systems to at least one other data storage system of the at least two data storage systems, and at least one software agent in
20 communication with at least one data replication management server for managing the fault tolerant resources, the method comprising:

configuring one or more software agents as failover agents that are in communication with another software agent that it is also in communication with the data replication management server, and at least one of the two data storage systems;

at least one of the one or more failover software agents taking over the data replication
5 operations in response to one or more data replication manager server commands to take over.

11. The method of Claim 10, wherein server commands to the software agent are sent over a network in accordance with an IP protocol.

10

12. The method of Claim 11, wherein the software agent communicates with the at least one data storage system over the network in accordance with a Fibre Channel protocol.

15 13. The method of Claim 10, wherein the server uses a predetermined hierarchal relationship to select the order in which each failover server is commanded to take over the work of the primary server.

14. A software agent failure tolerant computer system for managing resources for
20 replication of data stored in a data storage environment including at least two data storage systems, and wherein data is replicated from one of the at least two data storage systems

to at least one other data storage system of the at least two data storage systems, the system comprising:

a data replication management server;

a primary software agent in communication with at least one of the two data storage
5 systems and the data replication management server, the agent configured for performing data replication operations in response to commands from the data replication management server;

one or more failover software agents in communication with the primary software agent, the data replication management server, and at least one of the two data storage systems;

10 and

a computer-executable program for carrying out a failover protocol wherein if the primary agent experiences a failure, at least one of the one or more failover software agents takes over the data replication operations in response to one or more data replication manager server commands to take over.

15

15. The system of Claim 14, wherein server commands to the software agent are sent over a network in accordance with an IP protocol.

16. The system of Claim 15, wherein the software agent communicates with the at
20 least one data storage system over the network in accordance with a Fibre Channel protocol.

17. The system of Claim 14, wherein the server uses a predetermined hierarchal relationship to select the order in which each failover server is commanded to take over the work of the primary server.